

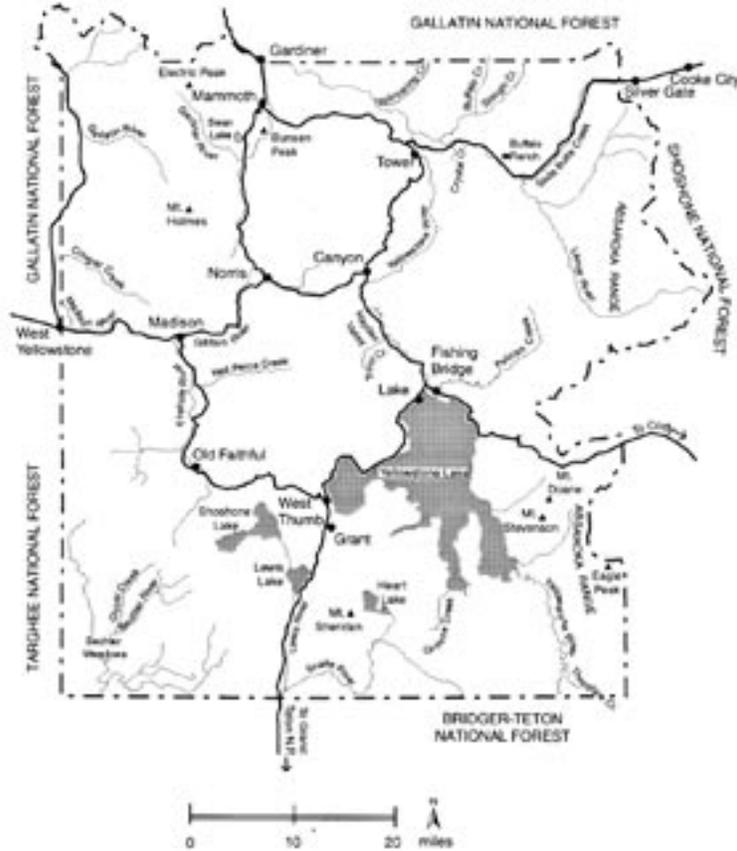
# INVESTIGATORS' ANNUAL REPORTS 2001

---



---

YELLOWSTONE NATIONAL PARK



## YELLOWSTONE NATIONAL PARK

**Yellowstone Center for Resources**

P.O. Box 168

Yellowstone National Park, Wyoming 82190

November 2003

YCR Investigators' Annual Report: YCR-IAR-2003

Cover: Spire segments found on the floor of Yellowstone Lake at Bridge Bay. Photo courtesy of Dr. Russell Cuhel, University of Wisconsin-Milwaukee.

Acknowledgements: The National Park Service thanks the researchers who have contributed to our knowledge and understanding of Yellowstone. This report was compiled and edited by Christie Hendrix and Virginia Warner.

# FOREWORD

Since the dawn of scientific wondering, human inquiry has led to the exploration, and often alteration, of almost everything in our world, at every scale—from the landscape of the moon to the human genome. In the national parks, however, through varying definitions and to varying degrees of success, we have attempted to “preserve natural conditions” for the past 130 years.

Their long-term preservation of natural resources makes parks reservoirs of information of great value to humanity. Today more than ever before, America’s national parks are viewed as more than pleasuring grounds and nature preserves. The NPS’s Natural Resource Challenge urges that in addition to using science as a means to improve park management, parks can and should be centers for broad scientific research and inquiry.

The national parks have long-captured the imagination of scientists, who recognized them as places where we could observe natural processes operating in places that had been less subject to human alteration than most others throughout the nation, and indeed throughout the world. In Yellowstone, those kinds of observed processes have ranged from macro-scale studies of landscape changes affecting the local ecosystem to micro-scale studies of tiny organisms that have the potential to change the lives of people the world over, making the protection of this wilderness relevant and crucial even to those who will never know its aesthetic and recreational wonders.

There are more than 300 index entries in this year’s Investigators’ Annual Report. That is a lot of scientific knowledge to be shared. This report should not be seen as the body of that knowledge, but rather as its skeleton. Contact information is provided so that readers may learn more about the projects and results described here. Project findings are also available on the NPS website (<http://science.nature.nps.gov/permits/index.jsp>).

All persons who wish to conduct their own research in Yellowstone are required to apply for a permit. Information on permitting procedures is available from the Research Permitting Office, Yellowstone Center for Resources, P.O. Box 168, Yellowstone National Park, WY 82190.

# TABLE OF CONTENTS

---

ANIMAL COMMUNITIES.....	4
ANTHROPOLOGY.....	9
ARCHEOLOGY.....	10
BOTANY.....	13
ECOLOGY.....	17
ENDANGERED SPECIES.....	50
ENTOMOLOGY.....	52
ENVIRONMENTAL MONITORING.....	55
EXOTIC SPECIES.....	58
FIRE.....	63
FISHERIES MANAGEMENT.....	70
FORESTRY.....	73
GEOCHEMISTRY.....	76
GEOLOGY.....	90
GEOSEDIMENTOLOGY.....	99
GEOMORPHOLOGY.....	101
GEOPHYSICS.....	102
HERPETOLOGY.....	106
HYDROLOGY.....	108
LIMNOLOGY.....	110
MAMMALOLOGY.....	113
MICROBIOLOGY.....	118
ORNITHOLOGY.....	148
OTHER.....	151
PALEOECOLOGY.....	154
PALEONTOLOGY.....	155
RESTORATION.....	157
SOCIAL SCIENCE.....	159
VOLCANOLOGY.....	161
WATER QUALITY.....	166
WETLANDS.....	169
ZOOLOGY.....	170
INDEX OF INVESTIGATORS.....	172